

## AMENDMENTS TO THE CLAIMS

1. (Original) A sensor system for detecting an effector or cofactor, comprising:
  - (a) a nucleic acid enzyme, comprising a cofactor binding site and optionally an effector binding site;
  - (b) substrates for the nucleic acid enzyme, comprising first polynucleotides;
  - (c) a first set of particles comprising second polynucleotides, wherein the polynucleotides are attached to the particles at the 3' terminus; and
  - (d) a second set of particles comprising third polynucleotides, wherein the polynucleotides are attached to the particles at the 5' terminus;wherein the first polynucleotides comprise or are at least partially complementary to the second polynucleotides, and  
the first polynucleotides comprise or are at least partially complementary to the third polynucleotides.
2. (Original) The sensor system of claim 1, wherein the nucleic acid enzyme comprises DNA.
3. (Original) The sensor system of claim 2, wherein the first set of particles and the second set of particles comprise gold.
4. (Original) The sensor of claim 2, wherein the first set of particles and the second set of particles comprise a material selected from the group consisting of metals, semiconductors and latex.
5. (Original) The sensor of claim 2, wherein the effector or cofactor is selected from the group consisting of nitrogen fertilizers, pesticides, dioxin, phenols, 2,4-dichlorophenoxyacetic acid, Pb(II), Hg(II), As(III), UO<sub>2</sub>(II), Fe(III), Zn(II), Cu(II), Co(II), glucose, insulin, hCG-hormone, HIV, HIV proteins, anthrax, small pox, nerve gases, TNT, DNT, cocaine and antibiotics.

6-16. (Cancelled)

17. (Original) A sensor system for detecting an effector or cofactor, comprising:
- (a) a nucleic acid enzyme, comprising a cofactor binding site and optionally an effector binding site;
  - (b) substrates for the nucleic acid enzyme, comprising first polynucleotides;
  - (c) a first set of particles comprising second polynucleotides; and
  - (d) a second set of particles comprising third polynucleotides;
- wherein the first polynucleotides comprise or are at least partially complementary to the second polynucleotides,
- the first polynucleotides comprise or are at least partially complementary to the third polynucleotides, and
- the second set of particles have a diameter of at least 20 nm.
18. (Original) The sensor system of claim 17, wherein the second set of particles have a diameter of at least 30 nm.
19. (Original) The sensor system of claim 18, wherein the nucleic acid enzyme comprises DNA.
20. (Original) The sensor system of claim 18, wherein the first set of particles and the second set of particles comprise gold.
21. (Original) The sensor of claim 18, wherein the first set of particles and the second set of particles comprise a material selected from the group consisting of metals, semiconductors and latex.
22. (Original) The sensor of claim 18, wherein the effector or cofactor is selected from the group consisting of nitrogen fertilizers, pesticides, dioxin, phenols, 2,4-dichlorophenoxyacetic acid, Pb(II), Hg(II), As(III), UO<sub>2</sub>(II), Fe(III), Zn(II), Cu(II), Co(II), glucose, insulin, hCG-hormone, HIV, HIV proteins, anthrax, small pox, nerve gases, TNT, DNT, cocaine and antibiotics.

23-41. (Cancelled)

42. (New) The sensor system of claim 2, wherein the second set of particles have a diameter of at least 20 nm.

43. (New) The sensor system of claim 42, wherein the second set of particles have a diameter of at least 30 nm.

44. (New) The sensor system of claim 2, further comprising a buffer.

45. (New) The sensor system of claim 44, wherein the buffer is selected to have a pH of 6.2 to 10.2.

46. (New) The sensor system of claim 45, wherein the buffer is selected to have a pH of 7.2 to 9.2.

47. (New) The sensor system of claim 2, wherein components of the sensor system are in an aqueous solution having an ionic strength of at least 0.20.

48. (New) The sensor system of claim 2, wherein the nucleic acid enzyme is present at a concentration of at least 0.2  $\mu\text{M}$ .

49. (New) The sensor system of claim 2, wherein the first polynucleotides are present at a concentration of at least 1.5 nM.

50. (New) The sensor system of claim 18, wherein the second polynucleotides are attached to the particles at the 3' terminus and the third polynucleotides are attached to the particles at the 5' terminus.

51. (New) The sensor system of claim 18, further comprising a buffer.

52. (New) The sensor system of claim 51, wherein the buffer is selected to have a pH of 6.2 to 10.2.

53. (New) The sensor system of claim 52, wherein the buffer is selected to have a pH of 7.2 to 9.2.

54. (New) The sensor system of claim 18, wherein components of the sensor system are in an aqueous solution having an ionic strength of at least 0.20.

55. (New) The sensor system of claim 18, wherein the nucleic acid enzyme is present at a concentration of at least 0.2  $\mu$ M.

56. (New) The sensor system of claim 18, wherein the first polynucleotides are present at a concentration of at least 1.5 nM.

57. (New) A sensor system for detecting an effector or cofactor, comprising:

- (a) a nucleic acid enzyme, comprising a cofactor binding site and optionally an effector binding site;
- (b) substrates for the nucleic acid enzyme, comprising first polynucleotides;
- (c) a first set of particles comprising second polynucleotides, wherein the polynucleotides are attached to the particles at the 3' terminus; and
- (d) a second set of particles comprising third polynucleotides, wherein the polynucleotides are attached to the particles at the 5' terminus;

wherein the first polynucleotides comprise or are at least partially complementary to the second polynucleotides,

the first polynucleotides comprise or are at least partially complementary to the third polynucleotides, and

the second set of particles have a diameter of at least 20 nm.

58. (New) The sensor system of claim 57, wherein the second set of particles have a diameter of at least 30 nm.

59. (New) The sensor system of claim 57, wherein the nucleic acid enzyme comprises DNA.

60. (New) The sensor system of claim 58, wherein the first set of particles and the second set of particles comprise gold.

61. (New) The sensor of claim 58, wherein the first set of particles and the second set of particles comprise a material selected from the group consisting of metals, semiconductors and latex.

62. (New) The sensor of claim 58, wherein the effector or cofactor is selected from the group consisting of nitrogen fertilizers, pesticides, dioxin, phenols, 2,4-dichlorophenoxyacetic acid, Pb(II), Hg(II), As(III), UO<sub>2</sub>(II), Fe(III), Zn(II), Cu(II), Co(II), glucose, insulin, hCG-hormone, HIV, HIV proteins, anthrax, small pox, nerve gases, TNT, DNT, cocaine and antibiotics.

63. (New) The sensor system of claim 58, further comprising a buffer.

64. (New) The sensor system of claim 63, wherein the buffer is selected to have a pH of 6.2 to 10.2.

65. (New) The sensor system of claim 64, wherein the buffer is selected to have a pH of 7.2 to 9.2.

66. (New) The sensor system of claim 58, wherein components of the sensor system are in an aqueous solution having an ionic strength of at least 0.20.

67. (New) The sensor system of claim 58, wherein the nucleic acid enzyme is present at a concentration of at least 0.2  $\mu$ M.

68. (New) The sensor system of claim 58, wherein the first polynucleotides are present at a concentration of at least 1.5 nM.

69. (New) The sensor of claim 2, wherein the effector or cofactor is a heavy metal ion.

70. (New) The sensor of claim 18, wherein the effector or cofactor is a heavy metal ion.

71. (New) The sensor of claim 58, wherein the effector or cofactor is a heavy metal ion.